



# Programmer's Guide

DT-210/230  
Thermal Receipt Printer



## About This Manual

**Please read this technical manual before programming.**

### **Main description for command as below:**

#### 1) Function

This is the first part of command description. Here we propose the command of ASCII code and its function.

#### 2) Format

This part describes the command with ASCII code format, HEX., format, and Decimal format.

#### 3) Range

The range of the variable

The range value is default as decimal digit. For example,  $1 \leq n \leq 4$ , "1" and "4" are decimal digits.

#### 4) Description

Detailed illustration for the command

#### 5) Note

Different mode must be with different command. This part explains the interaction details in different mode.

#### 6) Reference

Other commands which are interrelated or similar with this.

## TABLE OF CONTENTS

About This Manual .....	i
<b>1 Bit Image Commands .....</b>	<b>1</b>
Select bit-image mode.....	1
Define downloaded bit image .....	1
Print downloaded bit image .....	2
Set graphics data .....	2
GS ( L pL pH m fn [parameters].....	3
<i>Transmit the NV graphics memory capacity .....</i>	<i>4</i>
<Function 50> GS ( L pL pH m fn (fn = 2, 50) .....	4
<Function 51> GS ( L pL pH m fn (fn = 3, 51) .....	4
<Function 64> GS ( L pL pH m fn d1 d2 (fn = 64).....	4
<Function 65> GS ( L pL pH m fn d1 d2 d3 (fn = 65) .....	5
<Function 66> GS ( L pL pH m fn kc1 kc2 (fn = 66) .....	5
<Function 67> GS ( L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1....dk]b (fn = 67) .....	5
<Function 69> GS ( L pL pH m fn kc1 kc2 x y (fn = 69) .....	6
<Function 112> GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk (fn = 112) .....	7
<b>2 Print Position Commands .....</b>	<b>8</b>
HT.....	8
ESC \$ nL nH .....	8
ESC T n .....	8
GS \$ nL nH.....	8
ESC \ nL nH.....	9
ESC W xL xH yL yH dxL dxH dyL dyH.....	9
ESC a n .....	10
ESC D n1...nk NUL.....	10
GS L nL nH .....	10
GS W nL nH .....	11
GS \ nL nH .....	11
<b>3 Print Commands .....</b>	<b>12</b>
LF.....	12
FF (In page mode) .....	12
CR.....	12
ESC FF .....	12
ESC J n.....	13
ESC d n.....	13
GS ( K pL pH fn [parameters] .....	13
GS ( A pL pH n m.....	14

<b>4 Miscellaneous Function Commands .....</b>	<b>15</b>
DLE ENQ n .....	15
DLE DC4 fn m t (fn=1) .....	15
DLE DC4 fn a b (fn = 2) .....	16
DLE DC4 fn d1...d7 (fn = 8) .....	16
ESC @ .....	17
ESC = n .....	17
ESC S .....	17
ESC L .....	17
ESC p m t1 t2 .....	18
GS I n .....	18
GS P x y .....	19
GS ( D pL pH m [a1 b1]...[ak bk]) .....	20
GS ( E pL pH fn [parameters]) .....	20
<Function 1> GS ( E pL pH fn d1 d2 (fn = 1) .....	21
<Function 2> GS ( E pL pH fn d1 d2 d3 (fn = 2) .....	21
<Function 5> GS ( E pL pH fn [a1 n1L n1H]...[ak nkL nkH] (fn = 5) .....	22
<Function 6> GS ( E pL pH fn a (fn = 6) .....	24
<Function 11> GS ( E pL pH fn a d1...dk (fn = 11) .....	24
<Function 12> GS ( E pL pH fn a (fn = 12) .....	25
<b>5 Character Control Commands .....</b>	<b>26</b>
ESC ! n .....	26
ESC % n .....	26
ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)] .....	27
ESC ? n .....	27
ESC SP n .....	27
CAN .....	27
ESC – n .....	28
ESC E n .....	28
ESC R n .....	28
ESC M n .....	29
ESC V n .....	29
ESC { n .....	30
ESC G n .....	30
GS B n .....	30
GS ! n .....	30
ESC t n .....	31
<b>6 Macro Function Commands .....</b>	<b>32</b>
GS : .....	32
GS ^ r t m .....	32
<b>7 Status Commands .....</b>	<b>33</b>
GS a n .....	33

DLE EOT n .....	35
<b>8 Barcode Commands .....</b>	<b>38</b>
GS h n .....	38
GS f n .....	38
GS H n .....	38
GS k .....	38
GS w n .....	40
GS ( k pL pH cn fn [parameters] .....	41
<Function 067> GS ( k pL pH cn fn n (cn = 48, fn = 67) .....	42
<Function 068> GS ( k pL pH cn fn n (cn = 48, fn = 68) .....	42
<Function 080> GS ( k pL pH cn fn m d1...dk (cn = 48, fn = 80) .....	42
<Function 081> GS ( k pL pH cn fn m (cn = 48, fn = 81) .....	42
<Function 082> GS ( k pL pH cn fn m (cn = 48, fn = 82) .....	43
<Function 167> GS ( k pL pH cn fn n (cn = 49, fn = 67) .....	43
<Function 169> GS ( k pL pH cn fn n (cn = 49, fn = 69) .....	43
<Function 180> GS ( k pL pH cn fn m d1...dk (cn = 49, fn = 80) .....	44
<Function 181> GS ( k pL pH cn fn m (cn = 49, fn = 81) .....	44
<b>9 Mechanical Control Commands .....</b>	<b>45</b>
GS V .....	45
ESC i [obsolete command] .....	45
ESC m [obsolete command] .....	45
<b>10 Other Commands .....</b>	<b>46</b>
FS p n m [obsolete command] .....	46
FS q n [xL xH yL yH d1...dk]1 ... [xL xH yL yH d1...dk]n [obsolete command] .....	46
GS v 0 m xL xH yL yH d1...dk [obsolete command] .....	47
FS g 1 m a1 a2 a3 a4 nL nH d1...dk .....	47
FS g 2 m a1 a2 a3 a4 nL nH [obsolete command] .....	48
GS g 0 m nL nH .....	48
ESC 2 .....	49
ESC 3 n .....	49
ESC c 3 n .....	50
ESC c 4 n .....	50
ESC c 5 n .....	51
GS g 2 m nL nH .....	51
<b>DASCOM REPRESENTATIVES .....</b>	<b>52</b>

# 1 Bit Image Commands

## Select bit-image mode

**[Format]**      ASCII                  ESC   \*      m nL nH d1...dk  
                  Hex                    1B   2A      m nL nH d1...dk  
                  Decimal                27   42      m nL nH d1...dk

**[Range]**        m = 0, 1, 32, 33  
                   $1 \leq (nL + nH \times 256) \leq 2047$   
                   $(0 \leq nL \leq 255, 0 \leq nH \leq 7)$   
                   $0 \leq d \leq 255$   
                   $k = nL + nH \times 256$  [when m = 0, 1]  
                   $k = (nL + nH \times 256) \times 3$  [when m = 32, 33]

**[Description]**    • Stores the bit image data in the print buffer using the bit image mode specified by m.

m	Bit image mode	Vertical direction	Horizontal direction
0	8 dots single-density	60 dpi	90 dpi
1	8 dots dual-density	60 dpi	180 dpi
32	24-dot single-density	180 dpi	90 dpi
33	24-dot double-density	180 dpi	180 dpi

- nL, nH specifies the number of dots of the image data in the horizontal direction as (nL + nH × 256).
- d specifies the bit image data (column format).

## Define downloaded bit image

**[Format]**        ASCII                  GS   \*      x      y      d1...dk  
                  Hex                    1D   2A      x      y      d1...dk  
                  Decimal                29   42      x      y      d1...dk

**[Range]**         $1 \leq x \leq 255$   
                   $1 \leq y \leq 48$  [where  $1 \leq x \times y \leq 1536$ ]  
                   $0 \leq d \leq 255$   
                   $k = x \times y \times 8$

**[Description]**    • Defines the downloaded bit image in the downloaded graphic area.  
                  • x specifies the number of bytes in the horizontal direction as x bytes.  
                  • y specifies the number of bytes in the vertical direction as y bytes.  
                  • d specifies the defined data (column format).

**Print downloaded bit image**

<b>[Format]</b>	ASCII	GS	/	m
	Hex	1D	2F	m
	Decimal	29	47	m

**[Range]**  $0 \leq m \leq 3, 48 \leq m \leq 51$

**[Description]** Prints downloaded bit image defined by GS \* and using the mode specified by m.

m	Mode	Vertical direction	Horizontal direction
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51i	Quadruple	90 dpi	90 dpi

**Set graphics data**

<b>[Format]</b>	ASCII	GS	8	L	p1	p2	p3	p4	m	fn	[parameters]
	Hex	1D	38	4C	p1	p2	p3	p4	m	fn	[parameters]
	Decimal	29	56	76	p1	p2	p3	p4	m	fn	[parameters]

- In the description below, only GS (L is used for explanation).
- Note that GS (L and GS 8 L have the same function).
- If the [parameters] in the Format column in the table below exceed 65533 bytes, use GS 8 L.
- The only differences between GS (L and GS 8 L are as listed below. The format for GS 8 L is not provided in the following descriptions; however, [Range], [Default], [Description], and [Notes] for parameters other than those listed in the table below are the same as for GS (L. <Parameters specifying the number of parameters after pH or p4>

Command	Parameters	Structure	Maximum value
GS ( L	pL, pH	2 bytes	65,535
GS 8 L	p1, p2, p3, p4	4 bytes	4,294,967,295

- Processes graphics data.
- pL, pH specify (pL + pH × 256) as the number of bytes after pH (m, fn, and [parameters]).
- fn specifies the function.
- [parameters] specify the process of each function.

**GS ( L pL pH m fn [parameters])**

<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn	[parameters]
	Hex	1D	28	4C	pL	pH	m	fn	[parameters]
	Decimal	29	40	76	pL	pH	m	fn	[parameters]

fn	Format	Function No.	Function name
0, 48	GS ( L pL pH m fn	0, 48	Transmit the NV graphics memory capacity
2, 50	GS ( L pL pH m fn	2, 50	Print the graphics data in the print buffer
3, 51	GS ( L pL pH m fn	3, 51	Transmit the remaining capacity of the NV graphics memory
64	GS ( L pL pH m fn d1 d2	64	Transmit the key code list for defined NV graphics
65	GS ( L pL pH m fn d1 d2 d3	65	Delete all NV graphics data
66	GS ( L pL pH m fn kc1 kc2	66	Delete the specified NV graphics data
67	GS ( L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1... [c d1...dk]b	67	Define the NV graphics data (raster format)
69	GS ( L pL pH m fn kc1 kc2 x y	69	Print the specified NV graphics data
112	GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk	112	Store the graphics data in the print buffer (raster format)

**[Note]**

- Frequent write command executions by an NV memory write command may damage the NV memory.  
Therefore, it is recommended to limit writing the commands into the NV memory to less than 10 times a day.
- If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
- While processing this command, the printer is BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data, including the real-time commands, while the printer is BUSY.
- When <Function 48, 51, or 64> is transmitted, do not transmit the subsequent data until the status is received. ESC/POS Handshaking Protocol procedures are required when using <Function 64>.



**Transmit the NV graphics memory capacity**

<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn
	Hex	1D	28	4C	pL	pH	m	fn
	Decimal	29	40	76	pL	pH	m	fn
<b>[Range]</b>	$(pL + pH \times 256) = 2$ (pL = 2, pH = 0)							
	m = 48							
	fn = 0, 48							
<b>[Description]</b>	Transmit the entire capacity of the NV graphics area (number of bytes in the NV graphics area).							

**<Function 50> GS ( L pL pH m fn (fn = 2, 50)**

<b>[Function]</b>	Print the graphics data in the print buffer							
<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn
	Hex	1D	28	4C	pL	pH	m	fn
	Decimal	29	40	76	pL	pH	m	fn
<b>[Range]</b>	$(pL + pH \times 256) = 2$ (pL = 2, pH = 0)							
	m = 48							
	fn = 2, 50							
<b>[Description]</b>	Prints the buffered graphics data stored by processing of GS ( L <Function 112>.							

**<Function 51> GS ( L pL pH m fn (fn = 3, 51)**

<b>[Function]</b>	Transmit the remaining capacity of the NV graphics memory							
<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn
	Hex	1D	28	4C	pL	pH	m	fn
	Decimal	29	40	76	pL	pH	m	fn
<b>[Range]</b>	$(pL + pH \times 256) = 2$ (pL = 2, pH = 0)							
	m = 48							
	fn = 3, 51							
<b>[Description]</b>	Transmit the number of bytes of remaining memory (unused area) in the NV graphics area.							

**<Function 64> GS ( L pL pH m fn d1 d2 (fn = 64)**

<b>[Function]</b>	Transmit the key code list for defined NV graphics							
<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn d1 d2
	Hex	1D	28	4C	pL	pH	m	fn d1 d2
	Decimal	29	40	76	pL	pH	m	fn d1 d2
<b>[Range]</b>	$(pL + pH \times 256) = 4$ (pL = 4, pH = 0)							
	m = 48							
	fn = 64							
	d1 = 75							
	d2 = 67							
<b>[Description]</b>	Transmit the key code list for defined NV graphics.							

**<Function 65> GS ( L pL pH m fn d1 d2 d3 (fn = 65)**

[Function]	Delete all NV graphics data											
[Format]	ASCII	GS	(	L	pL	pH	m	fn	d1	d2	d3	
	Hex	1D	28	4C	pL	pH	m	fn	d1	d2	d3	
	Decimal	29	40	76	pL	pH	m	fn	d1	d2	d3	
[Range]	(pL + pH × 256) = 5 (pL = 5, pH = 0)											
	m = 48											
	fn = 65											
	d1 = 67											
	d2 = 76											
	d3 = 82											
[Description]	Delete all NV graphics data.											

**<Function 66> GS ( L pL pH m fn kc1 kc2 (fn = 66)**

<b>[Function]</b>	Delete the specified NV graphics data											
<b>[Format]</b>	ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2		
	Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2		
	Decimal	29	40	76	pL	pH	m	fn	kc1	kc2		
<b>[Range]</b>	(pL + pH × 256) = 4 (pL = 4, pH = 0)											
	m = 48											
	fn = 66											
	32 ≤ kc1 ≤ 126											
	32 ≤ kc2 ≤ 126											
<b>[Description]</b>	Delete the NV graphics data defined by the key codes (kc1 and kc2).											

**<Function 67> GS ( L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1....dk]b (fn = 67)**

[Function]	Define the NV graphics data (raster format)	
[Format]	ASCII	GS ( L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b
	Hex	1D 28 4C pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b
	Decimal	29 40 76 pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b
[Range]	(pL, pH) for GS ( L: $12 \leq (pL + pH \times 256) \leq 65535$ ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )	
	(p1, p2, p3, p4) for GS 8 L:	
	$12 \leq (p1 + p2 \times 256 + p3 \times 65536 + p4 \times 16777216) \leq 4294967295$	
	$(0 \leq p1 \leq 255, 0 \leq p2 \leq 255, 0 \leq p3 \leq 255, 0 \leq p4 \leq 255)$	
	Common parameters for GS ( L and GS 8 L:	
	m = 48	
	fn = 67	
	a = 48	
	$32 \leq kc1 \leq 126$	
	$32 \leq kc2 \leq 126$	
b = 1 [when single-color print control is selected]		
b = 1, 2 [when two-color print control is selected]		
$1 \leq (xL + xH \times 256) \leq 8192$ ( $0 \leq xL \leq 255, 0 \leq xH \leq 32$ )		
$1 \leq (yL + yH \times 256) \leq 2304$ ( $0 \leq yL \leq 255, 0 \leq yH \leq 9$ )		

$c = 49$  [when single-color print control is selected]

$c = 49, 50$  [when two-color print control is selected]

$0 \leq d \leq 255$

$k = (\text{int}((xL + xH \times 256) / 8) \times (yL + yH \times 256))$

The entire capacity size = 256 KB maximum.

- [Description]**
- Defines the NV graphics data (raster format) as a record specified by the key codes (kc1, kc2) in the NV graphics area.
  - b specifies the number of the color of the defined data.
  - xL, xH specify the number of dots in the horizontal direction as  $(xL + xH \times 256)$ .
  - yL, yH specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
  - c specifies the color of the defined data.

c	Defined data color (*)
49	Color 1
50	Color 2

(\*) Color 1 means black (a high level of energy) in the specified two-color thermal paper.

Color 2 means red (a low level of energy) in the specified two-color thermal paper.

- [Notes]**
- d specifies the defined data (raster format).
  - In cases where there is sufficient capacity is not available for storing NV graphics data specified by  $(xL + xH \times 256)$  and  $(yL + yH \times 256)$ , this function is ignored.
  - The number of items of NV graphics registered should be within 50 to shorten the execution time of this function. The execution time is 60 seconds or less when the number of items registered is within 50. The execution time for 100 items is 120 seconds or less.
  - The [data value (k) + control information data value (24 bytes)] area of the NV graphics data domain is used when this function is executed.
  - NV graphics and NV bit image (FS q) cannot be defined simultaneously. When this function is executed, all NV bit images are deleted.

#### <Function 69> GS ( L pL pH m fn kc1 kc2 x y (fn = 69)

**[Function]** Print the specified NV graphics data

**[Format]**

ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2	x	y
Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2	x	y
Decimal	29	40	76	pL	pH	m	fn	kc1	kc2	x	y

**[Range]**

$(pL + pH \times 256) = 6$  ( $pL = 6, pH = 0$ )

$m = 48$

$fn = 69$

$32 \leq kc1 \leq 126$

$32 \leq kc2 \leq 126$

$x = 1, 2$

$y = 1, 2$

- [Description]**
- Prints the NV graphics data defined by the key codes (kc1 and kc2).
  - The graphics data is enlarged by x and y in the horizontal and vertical directions.

x, y	Vertical direction	Horizontal direction
1	180 dpi	180 dpi
2	90 dpi	90 dpi

**<Function 112> GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk (fn = 112)**

**[Function]** Store the graphics data in the print buffer (raster format)

**[Format]** ASCII GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk  
Hex 1D 28 4C pL pH m fn a bx by c xL xH yL yH d1...dk  
Decimal 29 40 76 pL pH m fn a bx by c xL xH yL yH d1...dk

**[Range]** (pL, pH) for GS ( L:

$$11 \leq (pL + pH \times 256) \leq 65535 \quad (0 \leq pL \leq 255, 0 \leq pH \leq 255)$$

(p1, p2, p3, p4) for GS 8 L:

$$11 \leq (p1 + p2 \times 256 + p3 \times 65536 + p4 \times 16777216) \leq 4294967295$$

$$(0 \leq p1 \leq 255, 0 \leq p2 \leq 255, 0 \leq p3 \leq 255, 0 \leq p4 \leq 255)$$

Common parameters for GS ( L and GS 8 L:

$$m = 48$$

$$fn = 112$$

$$a = 48$$

$$bx = 1, 2; by = 1, 2$$

$$c = 49 \quad [\text{when single-color print control is selected}]$$

$$c = 49, 50 \quad [\text{when two-color print control is selected}]$$

$$1 \leq (xL + xH \times 256) \leq 2047 \quad (0 \leq xL \leq 255, 0 \leq xH \leq 7)$$

When single-color print control is selected

$$1 \leq (yL + yH \times 256) \leq 1662 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 6) \quad [\text{when } by=1]$$

$$1 \leq (yL + yH \times 256) \leq 831 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 3) \quad [\text{when } by=2]$$

When two-color print control is selected

$$1 \leq (yL + yH \times 256) \leq 831 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 3) \quad [\text{when } by=1]$$

$$1 \leq (yL + yH \times 256) \leq 415 \quad (0 \leq yL \leq 255, yH = 0,1) \quad [\text{when } by=2]$$

$$0 \leq d \leq 255$$

$$k = (\text{int}((xL + xH \times 256) + 7) / 8) \times (yL + yH \times 256)$$

**[Description]**

- Stores the graphics data (raster format) in the print buffer.
- The graphics data is enlarged by bx and by in the horizontal and vertical directions.

bx, by	Vertical direction	Horizontal direction
1	180 dpi	180 dpi
2	90 dpi	90 dpi

- c specifies the color for the stored data.

(\*) Color 1 means black (a high level of energy) in the specified two-color thermal paper.

Color 2 means red (a low level of energy) in the specified two-color thermal paper.

- xL, xH specify the number of dots in the horizontal direction as  $(xL + xH \times 256)$ .
- yL, yH specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
- d specifies the stored data (raster format).

## 2 Print Position Commands

### HT

<b>[Function]</b>	Horizontal Tabs		
<b>[Format]</b>	ASCII	HT	
	Hex	09	
	Decimal	9	
<b>[Description]</b>	Moves the print position to the next horizontal tab position.		

### ESC \$ nL nH

<b>[Function]</b>	Set absolute print position				
<b>[Format]</b>	ASCII	ESC	\$	nL	nH
	Hex	1B	24	nL	nH
	Decimal	27	36	nL	nH
<b>[Range]</b>	$0 \leq (nL + nH \times 256) \leq 65535$ $(0 \leq nL \leq 255, 0 \leq nH \leq 255)$				
<b>[Description]</b>	Moves the print position to $[(nL + nH \times 256) \times (\text{horizontal or vertical motion unit})]$ from the left edge of the print area.				

### ESC T n

<b>[Function]</b>	Select print direction in page mode			
<b>[Format]</b>	ASCII	ESC	T	n
	Hex	1B	54	n
	Decimal	27	84	n
<b>[Range]</b>	$0 \leq n \leq 3, 48 \leq n \leq 51$			
<b>[Default]</b>	n = 0			
<b>[Description]</b>	In page mode, selects the print direction and starting position.			

n	Print direction	Starting position
0, 48	Left to right	Upper left
1, 49	Bottom to top	Lower left
2, 50	Right to left L	Lower right
3, 51	Top to bottom	Upper right

### GS \$ nL nH

<b>[Function]</b>	Set absolute vertical print position in page mode				
<b>[Format]</b>	ASCII	GS	\$	nL	nH
	Hex	1D	24	nL	nH
	Decimal	29	36	nL	nH
<b>[Range]</b>	$0 \leq (nL + nH \times 256) \leq 65535$ $(0 \leq nL \leq 255, 0 \leq nH \leq 255)$				
<b>[Description]</b>	In page mode, moves the vertical print position to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ from the starting position set with <b>ESC T</b> .				

**ESC \ nL nH****[Function]** Set relative print position

<b>[Format]</b>	ASCII	ESC	\	nL	nH
	Hex	1B	5C	nL	nH
	Decimal	27	92	nL	nH

**[Range]**  $-32768 \leq (nL + nH \times 256) \leq 32767$ 

**[Description]**

- Moves the print position to  $[(nL + nH \times 256) \times (\text{horizontal or vertical motion unit})]$  from the current position.
- A positive number specifies movement to the right, and a negative number specifies movement to the left.

**ESC W xL xH yL yH dxL dxH dyL dyH****[Function]** Set print area in page mode

<b>[Format]</b>	ASCII	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Hex	1B	57	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

**[Range]**  $0 \leq (xL + xH \times 256) \leq 65535; (0 \leq xL \leq 255, 0 \leq xH \leq 255)$  $0 \leq (yL + yH \times 256) \leq 65535; (0 \leq yL \leq 255, 0 \leq yH \leq 255)$  $1 \leq (dxL + dxH \times 256) \leq 65535; (0 \leq dxL \leq 255, 0 \leq dxH \leq 255)$  $1 \leq (dyL + dyH \times 256) \leq 65535; (0 \leq dyL \leq 255, 0 \leq dyH \leq 255)$ 

**[Default]**

$(xL + xH \times 256) = 0$  ( $xL = 0, xH = 0$ )

$(yL + yH \times 256) = 0$  ( $yL = 0, yH = 0$ )

$(dxL + dxH \times 256) = 512$  ( $dxL = 0, dxH = 2$ )

[80 mm paper width model]

$(dxL + dxH \times 256) = 360$  ( $dxL = 104, dxH = 4$ )

[58 mm paper width model]

$(dyL + dyH \times 256) = 1662$  ( $dyL = 126, dyH = 6$ )

**[Description]**

- In page mode, sets the size and the logical origin of the print area.
- xL, xH specify the horizontal logical origin as  $[(xL + xH \times 256) \times (\text{horizontal motion unit})]$  from absolute origin.
- yL, yH specify the vertical logical origin as  $[(yL + yH \times 256) \times (\text{vertical motion unit})]$  from absolute origin.
- dxL, dxH specify the horizontal dimension of print area as  $[(dxL + dxH \times 256) \times (\text{horizontal motion unit})]$ .
- dyL, dyH specify the vertical dimension of print area as  $[(dyL + dyH \times 256) \times (\text{vertical motion unit})]$ .

**[Note]**

When single-color print control is selected, the vertical dimension of the print area can be set to 234.53 mm {3324/360"} maximum.

When two-color print control is selected, the vertical dimension of the print area can be set to 117.26 mm {1662/360"} maximum.

**ESC a n**

<b>[Function]</b>	Select justification			
<b>[Format]</b>	ASCII	ESC	a	n
	Hex	1B	61	n
	Decimal	27	97	n
<b>[Range]</b>	$0 \leq n \leq 2, 48 \leq n \leq 50$			
<b>[Default]</b>	n = 0			
<b>[Description]</b>	In standard mode, aligns all the data in one line to the selected layout.			

n	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

**ESC D n1...nk NUL**

<b>[Function]</b>	Setting horizontal tab position				
<b>[Format]</b>	ASCII	ESC	D	n1 ...nk	NUL
	Hex	1B	44	n1 ...nk	00
	Decimal	27	68	n1 ...nk	0
<b>[Range]</b>	$1 \leq n1 \leq n2 \leq \dots \leq nk \leq 255$ $0 \leq k \leq 32$				
<b>[Default]</b>	n = 8, 16, 24, 32, 40, ..., 232, 240, 248 [for Font A (12 × 24) in a standard character size width]				
<b>[Description]</b>	<ul style="list-style-type: none"> <li>Sets horizontal tab positions.</li> <li>n specifies the number of digits from the setting position to the left edge of the print area.</li> <li>k is used to indicate the number of bytes set for the horizontal tab position.</li> </ul>				

**GS L nL nH**

<b>[Function]</b>	Set left margin			
<b>[Format]</b>	ASCII	GS	L	nL nH
	Hex	1D	4C	nL nH
	Decimal	29	76	nL nH
<b>[Range]</b>	$0 \leq (nL + nH \times 256) \leq 65535$ ( $0 \leq nL \leq 255, 0 \leq nH \leq 255$ )			
<b>[Default]</b>	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )			
<b>[Description]</b>	In standard mode, sets the left margin to $[(nL + nH \times 256) \times (\text{horizontal motion unit})]$ .			

**GS W nL nH**

<b>[Function]</b>	Set print area width				
<b>[Format]</b>	ASCII	GS	W	nL	nH
	Hex	1D	57	nL	nH
	Decimal	29	87	nL	nH
<b>[Range]</b>	$0 \leq (nL + nH \times 256) \leq 65535$ ( $0 \leq nL \leq 255, 0 \leq nH \leq 255$ )				
<b>[Default]</b>	$(nL + nH \times 256) = 576$ ( $nL = 64, nH = 2$ ) [80 mm paper width model]				
	$(nL + nH \times 256) = 406$ ( $nL = 150, nH = 1$ ) [58 mm paper width model]				
<b>[Description]</b>	In standard mode, sets the print area width to $[(nL + nH \times 256) \times (\text{horizontal motion unit})]$ .				

**GS \ nL nH**

<b>[Function]</b>	Set relative vertical print position in page mode				
<b>[Format]</b>	ASCII	GS	\	nL	nH
	Hex	1D	5C	nL	nH
	Decimal	29	92	nL	nH
<b>[Range]</b>	$-32768 \leq (nL + nH \times 256) \leq 32767$				
<b>[Description]</b>	<ul style="list-style-type: none"> <li>In page mode, moves the vertical print position to <math>[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]</math> from the current position.</li> </ul>				
	<ul style="list-style-type: none"> <li>A positive number specifies downward movement, and a negative number specifies upward movement.</li> </ul>				



### 3 Print Commands

#### LF

<b>[Function]</b>	Print and line feed	
<b>[Format]</b>	ASCII	LF
	Hex	0A
	Decimal	10
<b>[Description]</b>	Prints the data in the print buffer and feeds one line, based on the current line spacing.	

#### FF (In page mode)

<b>[Function]</b>	Print and return to standard mode (in page mode)	
<b>[Format]</b>	ASCII	FF
	Hex	0C
	Decimal	12
<b>[Description]</b>	Prints all the data in the print buffer collectively and switches from page mode to standard mode.	

#### CR

<b>[Function]</b>	Print and carriage return	
<b>[Format]</b>	ASCII	CR
	Hex	0D
	Decimal	13
<b>[Description]</b>	Execute one of the following operations.	

Condition	Function
When automatic line feed is enabled.	Functions the same as LF.
When automatic line feed is disabled and when using the serial interface model.	This command is ignored.

#### ESC FF

<b>[Function]</b>	Print data in page mode		
<b>[Format]</b>	ASCII	ESC	FF
	Hex	1B	0C
	Decimal	27	12
<b>[Description]</b>	In page mode, prints all the data in the print buffer collectively.		

**ESC J n**

<b>[Function]</b>	Print and feed paper		
<b>[Format]</b>	ASCII	ESC J	n
	Hex	1B 4A	n
	Decimal	27 74	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Description]</b>	Prints the data in the print buffer and feeds the paper [ $n \times$ (vertical or horizontal motion unit)].		
<b>[Note]</b>	The maximum paper feed amount is 1016 mm {40"}.		

**ESC d n**

<b>[Function]</b>	Print and feed n lines		
<b>[Format]</b>	ASCII	ESC d	n
	Hex	1B 64	n
	Decimal	27 100	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Description]</b>	Prints the data in the print buffer and feeds the paper [ $n \times$ (current line spacing)].		
<b>[Note]</b>	The maximum paper feed amount is 1016 mm {40"}.		

**GS ( K pL pH fn [parameters])**

<b>[Function]</b>	Select print control method(s)
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fn	Format	Function No.	Function name
50	GS ( K pL pH fn m	50	Select the print speed.
97	GS ( K pL pH fn m	97	Select the number of parts for the thermal head energization.

<b>[Description]</b>	<ul style="list-style-type: none"> <li>• Selects the print control methods.</li> <li>• pL, pH specify (pL + pH <math>\times</math> 256) as the number of bytes after pH (fn and [parameters]).</li> <li>• fn specifies the function.</li> <li>• [parameters] specify the process of each function.</li> </ul>
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**GS ( A pL pH n m****[Function]** Execute test print

**[Format]** ASCII GS ( A pL pH n m  
 Hex 1D 28 41 pL pH n m  
 Decimal 29 40 65 pL pH n m

**[Range]**  $(pL + pH \times 256) = 2$  ( $pL = 2, pH = 0$ )  
 $0 \leq n \leq 2, 48 \leq n \leq 50$   
 $1 \leq m \leq 3, 49 \leq m \leq 51$

**[Description]**

- Executes a specified test print.
- pL, pH specify  $(pL + pH \times 256)$  as the number of bytes after pH (n and m).
- n specifies the paper used for the test print.

n	Paper source
0, 48	Basic sheet (roll paper)
1, 49	Roll paper
2, 50	

- m specifies a test pattern.

M	Test pattern
1,49	Hexadecimal dump print
2,50	Printer status print
3,51	Rolling pattern print

**[Note]**

- The printer executes software reset after processing this command.
- Clear the receive and print buffers.
- Resets all setting values in RAM (the print area, the character styles, and others) that were in effect at power on. (The data in the NV memory is not reset.)

## 4 Miscellaneous Function Commands

### DLE ENQ n

<b>[Function]</b>	Send real-time request to printer		
<b>[Format]</b>	ASCII	DLE ENQ	n
	Hex	10 05	n
	Decimal	16 5	n
<b>[Range]</b>	n = 1, 2		
<b>[Description]</b>	Respond to a request in real-time from the host computer.		

n	Function
1	Recovers from a recoverable error and restarts printing from the line where the error occurred. • This command is ignored unless a recoverable error has occurred.
2	Recovers from a recoverable error after clearing the receive and print buffers. • This command is ignored unless a recoverable error has occurred.

- [Note]**
- Use this command after removing the cause of the error.
  - Take the following into consideration:
    - If the received data includes a data string matching this command, the printer performs the command. Users must consider this.  
Example: Graphic data might accidentally include a data string matching this command.
    - Do not embed this command within another command.  
Example: Graphic data might include this command.

### DLE DC4 fn m t (fn=1)

<b>[Function]</b>	Generate pulse in real-time		
<b>[Format]</b>	ASCII	DLE DC4	fn m t
	Hex	10 14	fn m t
	Decimal	16 20	fn m t
<b>[Range]</b>	fn = 1		
	m = 0, 1		
	1 ≤ t ≤ 8		
<b>[Description]</b>	Outputs the pulse specified by t in real-time to connector pin m.		

m	Connector pin
0	Drawer kick-out connector pin 2.
1	Drawer kick-out connector pin 5.

- [Note]**
- t specifies the pulse on time or off time as [t × 100 ms].
  - Take the following into consideration:
    - If the received data includes a data string with this command, the printer performs the

command. Users must consider this.

Example: Graphic data might accidentally include a data string matching this command.

- Do not embed this command within another command.

Example: Graphic data might include this command.

#### **DLE DC4 fn a b (fn = 2)**

**[Function]** Execute power-off sequence

**[Format]**

ASCII	DLE DC4	fn	a	b
Hex	10 14	fn	a	b
Decimal	16 20	fn	a	b

**[Range]**

fn = 2

a = 1

b = 8

**[Description]**

- Executes the printer power-off sequence and transmits the power-off notice.
- Stores the values of the maintenance counter.
- Sets the interface to BUSY.
- Sets the printer to standby mode.

**[Note]** Take the following into consideration:

- If the received data includes a data string matching this command, the printer performs the command. Users must consider this. Example: Graphic data might accidentally include a data string matching this command.
- Do not embed this command within another command. Example: Graphic data might include this command.
- This command does not shut the power off. The operator must turn the power off after receiving the power-off notice.
- If this command is executed, the printer will not continue to process anything. To recover the printer to print again, it is necessary to turn the power on again or execute a hardware reset.

#### **DLE DC4 fn d1...d7 (fn = 8)**

**[Function]** Clear buffer(s)

**[Format]**

ASCII	DLE DC4	fn	d1...d7
Hex	10 14	fn	d1...d7
Decimal	16 20	fn	d1...d7

**[Range]**

fn = 8

d1 = 1, d2 = 3, d3 = 20, d4 = 1, d5 = 6, d6 = 2, d7 = 8

**[Description]**

- Clears all data stored in the receive buffer and the print buffer and transmits Clear response.

- If a recoverable error occurs, recovers from the error.

**[Note]** Take the following into consideration:

- If the received data includes a data string matching this command, the printer performs the command. Users must consider this.
- Example: Graphic data might accidentally include a data string matching this command.
- Do not embed this command within another command.

Example: Graphic data might include this command.

- Do not transmit the subsequent data until the status is received after transmitting this command.

### ESC @

**[Function]** Initialize printer

**[Format]**

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

**[Description]** • Clears the data in the print buffer and resets the printer modes to the modes that were in effect when the power was turned on.

Keeps the following data:

- Macro definition data.
- Contents stored in the NV user memory.
- Contents defined for the NV graphics (NV bit image).
- Maintenance counter value.
- Setting value specified with GS ( E.

### ESC = n

**[Function]** Select peripheral device

**[Format]**

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

**[Range]**  $0 \leq n \leq 3$

**[Default]**  $n = 1$

**[Description]** • Selects the device to which the host computer transmits data.

n	Function
1,3	Enables printer.
2	Disables printer.

- When the printer is disabled ( $n = 2$ ), all data except this command and the real-time commands are ignored.

### ESC S

**[Function]** Select standard mode

**[Format]**

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

**[Description]** Switches from page mode to standard mode

### ESC L

**[Function]** Select page mode

<b>[Format]</b>	ASCII	ESC	L
	Hex	1B	4C
	Decimal	27	76
<b>[Description]</b>	Switches from standard mode to page mode		

**ESC p m t1 t2**

<b>[Function]</b>	Generate pulse				
<b>[Format]</b>	ASCII	ESC	p	m	t1 t2
	Hex	1B	70	m	t1 t2
	Decimal	27	112	m	t1 t2
<b>[Range]</b>	m = 0, 1, 48, 49				
	0 ≤ t1 ≤ 255				
	0 ≤ t2 ≤ 255				
<b>[Description]</b>	<ul style="list-style-type: none"> <li>Outputs the pulse specified by t1 and t2 to connector pin m.</li> </ul>				

m	Connector pin
0, 48	Drawer kick-out connector pin 2.
1, 49	Drawer kick-out connector pin 5.

- t1 specifies the pulse on time as [t1 × 2 ms].
- t2 specifies the pulse off time as [t2 × 2 ms].

**[Note]** Specify a value (t1 < t2) so that the off time is longer than the on time.

**GS I n**

<b>[Function]</b>	Transmit printer ID		
<b>[Format]</b>	ASCII	GS	I n
	Hex	1D	49 n
	Decimal	29	73 n
<b>[Range]</b>	n = 1, 2, 49, 50 [the printer ID]		
	65 ≤ n ≤ 69 [printer information B]		
<b>[Description]</b>	<ul style="list-style-type: none"> <li>Transmits the printer ID or the information of the printer specified.</li> </ul>		
	<ul style="list-style-type: none"> <li>The printer IDs that can be specified are as follows:</li> </ul>		

n	Type of printer ID	ID
1,49	Printer model ID	Hexadecimal: 20 / Decimal: 32
2,50	Type ID	See table [Type ID].

## Type ID

Bit	Off / On	HEX	Decimal	Content
0	Off	00	0	Multi-byte code characters not supported.
	On	01	1	Multi-byte code characters supported
1	On	02	2	Auto cutter Installed. (Fixed)
2,3	_____	_____	_____	Not used.
4	Off	00	0	Fixed.
5	_____	_____	_____	Reserved.
6	_____	_____	_____	Not used.
7	Off	00	0	Fixed.

- The information B that can be specified is as follows:

n	Type of printer information	Content
65	Firmware version	Depends on firmware version.
66	Manufacturer	Tally DASCOTM
67	Printer name	DT-230
68	Product ID	Serial number.
69	Type of mounted additional fonts	Japanese model: "KANJI JAPANESE"
		Simplified Chinese model: "CHINA GB18030"
		traditional Chinese model: "TAIWAN BIG-5"

**[Note]**

When this command is transmitted, do not transmit the subsequent data until the status is received.

**GS P x y**

**[Function]** Set horizontal and vertical motion units

**[Format]**

ASCII	GS	P	x	y
Hex	1D	50	x	y
Decimal	29	80	x	y

**[Range]**  $0 \leq x \leq 255$

$0 \leq y \leq 255$

**[Default]**  $x = 180, y = 360$

**[Description]**

- Sets the horizontal and vertical motion units to approximately  $25.4/x$  mm  $\{1/x''\}$  and approximately  $25.4/y$  mm  $\{1/y''\}$ , respectively.
- When  $x = 0$ , the default value of the horizontal motion unit is used.
- When  $y = 0$ , the default value of the vertical motion unit is used.



**GS ( D pL pH m [a1 b1]...[ak bk])****[Function]** Enable/disable real-time command

**[Format]** ASCII GS ( D pL pH m [ a1 b1 ]...[ ak bk ]  
 Hex 1D 28 44 pL pH m [ a1 b1 ]...[ ak bk ]  
 Decimal 29 40 68 pL pH m [ a1 b1 ]...[ ak bk ]

**[Range]**  $3 \leq (pL + pH \times 256) \leq 65535$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )

m = 20

a = 1, 2

b = 0, 1, 48, 49

**[Default]** b = 1 [when a = 1]

b = 0 [when a = 2]

**[Description]**

- Enables or disables the real-time command specified by a.
- pL, pH specify (pL + pH × 256) as the number of bytes after pH (m and [a1 b1]...[ak bk]).

a	b	Function
1	0,48	DLE DC4 fn m t (fn = 1): Not processed (disabled).
	1,49	DLE DC4 fn m t (fn = 1): Processed (enabled).
2	0,48	DLE DC4 fn a b (fn = 2): Not processed (disabled).
	1,49	DLE DC4 fn a b (fn = 2): Processed (enabled).

**[Note]** If graphics data includes a data string matching DLE DC4 (fn = 1 or 2), it is recommended to use this command in advance to disable the real-time commands.

**GS ( E pL pH fn [parameters])****[Function]** Set user setup commands

**[Description]**

- Controls the user setting modes.
- pL, pH specify (pL + pH × 256) as the number of bytes after pH (fn and [parameters]).
- fn specifies the function.
- [parameters] specify the process of each function.

fn	Format	Function No.	Function name
1	GS ( E pL pH fn d1 d2	1	Change into the user setting mode.
2	GS ( E pL pH fn d1 d2 d3	2	End the user setting mode session.
5	GS ( E pL pH fn [a1 n1L n1H] ... [ak nkL nkH]	5	Set the customized setting values.
6	GS ( E pL pH fn a	6	Transmit the customized setting values.
11	GS ( E pL pH fn a d1...dk	11	Set the configuration item for the serial interface.
12	GS ( E pL pH fn a	12	Transmit the configuration item for the serial interface.

- [Note]**
- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing the commands into the NV memory to less than 10 times a day.
  - If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
  - While processing this command, the printer is BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data, including the real-time commands, while the printer is BUSY.
  - When <Function 1, 6, or 12> is transmitted, the data following must not be transmitted until the status is received.

#### <Function 1> GS ( E pL pH fn d1 d2 (fn = 1)

- [Function]** Change into the user setting mode
- [Format]**
- |         |    |    |    |    |    |    |    |    |
|---------|----|----|----|----|----|----|----|----|
| ASCII   | GS | (  | E  | pL | pH | fn | d1 | d2 |
| Hex     | 1D | 28 | 45 | pL | pH | fn | d1 | d2 |
| Decimal | 29 | 40 | 69 | pL | pH | fn | d1 | d2 |
- [Range]** (pL + pH × 256) = 3 (pL = 3, pH = 0)  
 fn = 1  
 d1 = 73  
 d2 = 78
- [Description]** Enters the user setting mode and transmits a mode change notice.

#### <Function 2> GS ( E pL pH fn d1 d2 d3 (fn = 2)

- [Function]** End the user setting mode session
- [Format]**
- |         |    |    |    |    |    |    |    |    |    |
|---------|----|----|----|----|----|----|----|----|----|
| ASCII   | GS | (  | E  | pL | pH | fn | d1 | d2 | d3 |
| Hex     | 1D | 28 | 45 | pL | pH | fn | d1 | d2 | d3 |
| Decimal | 29 | 40 | 69 | pL | pH | fn | d1 | d2 | d3 |
- [Range]** (pL + pH × 256) = 4 (pL = 4, pH = 0)  
 fn = 2  
 d1 = 79  
 d2 = 85  
 d3 = 84
- [Description]**
- Ends the user setting mode and performs a software reset.
  - Clears the receive and print buffers.
  - Resets all setting values in RAM (the print area, the character styles, and others) that were in effect at power on. (The data in the NV memory are not reset.)

**<Function 5>GS ( E pL pH fn [a1 n1L n1H]...[ak nkL nkH] (fn = 5)****[Function]** Set the customized setting values

**[Format]** ASCII GS ( E pL pH fn [a1 n1L n1H] ... [ak nkL nkH]  
 Hex 1D 28 45 pL pH fn [a1 n1L n1H] ... [ak nkL nkH]  
 Decimal 29 40 69 pL pH fn [a1 n1L n1H] ... [ak nkL nkH]

**[Range]**  $4 \leq (pL + pH \times 256) \leq 65533$  ( $0 \leq pL \leq 255$ ,  $0 \leq pH \leq 255$ )

fn = 5; a = 5, 6, 97, 116, 118

 $0 \leq (nL + nH \times 256) \leq 6$ ,  $(nL + nH \times 256) = 100$ ,  $65530 \leq (nL + nH \times 256) \leq 65535$  $(0 \leq nL \leq 6, nH = 0, nL = 100, nH = 0, 250 \leq nL \leq 255, nH = 255)$  [when a = 5] $1 \leq (nL + nH \times 256) \leq 9$  ( $1 \leq nL \leq 9, nH = 0$ ) [when a = 6] $(nL + nH \times 256) = 1, 2, 4, 128$  ( $nL = 1, 2, 4, 128, nH = 0$ ) [when a = 97] $(nL + nH \times 256) = 1, 257$  ( $nL = 1, nH = 0, 1$ ) [when a = 116] $(nL + nH \times 256) = 70, 85$  ( $nL = 70, 85, nH = 0$ ) [when a = 118]**[Default (upon shipment)]**  $(nL + nH \times 256) = 100$  ( $nL = 100, nH = 0$ ) [when a = 5] $(nL + nH \times 256) = 9$  ( $nL = 9, nH = 0$ ) [when a = 6] $(nL + nH \times 256) = 128$  ( $nL = 128, nH = 0$ ) [when a = 97] $(nL + nH \times 256) = 1$  ( $nL = 1, nH = 0$ ) [when a = 116] $(nL + nH \times 256) = 85$  ( $nL = 85, nH = 0$ ) [when a = 118]**[Description]** • Sets the customized value specified by a to the values specified by  $(nL + nH \times 256)$ .

a	Type of customized value
5	Print density
6	Print speed
97	Number of division of thermal head energization
116	Print control (single-color or two-color)
118	Black-color density in two-color printing

• Print density setting (a = 5)

$(nL + nH \times 256)$	Print density	
100	Density level depending on the DIP switch settings	
65530	Print density level 1.	light
65531	Print density level 2	
65532	Print density level 3	
65533	Print density level 4	
65534	Print density level 5	
65535	Print density level 6	
0	Print density level 7	standard
1	Print density level 8	
2	Print density level 9	
3	Print density level 10	
4	Print density level 11	
5	Print density level 12	
6	Print density level 13	dark

- Print speed setting (a = 6)

(nL + nH × 256)	Print speed level	
1	Print speed level 1.	slow
2	Print speed level 2	
3	Print speed level 3	
4	Print speed level 4	
5	Print speed level 5	
6	Print speed level 6	
7	Print speed level 7	
8	Print speed level 8	
9	Print speed level 9	fast

- Number of division of thermal head energization setting (a = 97)

(nL + nH × 256)	Number of division of thermal head energization
1	One-part energization.
2	Two-part energization.
4	Four-part energization.
128	Automatic control of thermal head energization.

- Print control (single-color or two-color) (a = 116)

(nL + nH × 256)	Print control
1	Single-color print control.
257	Two-color print control.

(\*) When "two-color print control" is selected, the use of single-color thermal paper is prohibited.

- Black-color density in two-color printing setting (a = 118)

(nL + nH × 256)	Black-color density
70	Light
85	Standard

(\*) The black-color density is affected only in two-color printing.

**<Function 6> GS ( E pL pH fn a (fn = 6)****[Function]** Transmit the customized setting values

**[Format]** ASCII GS ( E pL pH fn a  
 Hex 1D 28 45 pL pH fn a  
 Decimal 29 40 69 pL pH fn a

**[Range]**  $(pL + pH \times 256) = 2$  ( $pL = 2, pH = 0$ )  
 fn = 6  
 a = 5, 6, 97, 116, 118

**[Description]** Transmits the customized value specified by a.

a	Type of customized value
5	Print density
6	Print speed
97	Number of division of thermal head energization
116	Print control (single-color or two-color)
118	Black-color density in two-color printing

**<Function 11> GS ( E pL pH fn a d1...dk (fn = 11)****[Function]** Set the configuration item for the serial interface

**[Format]** ASCII GS ( E pL pH fn a d1 ... dk  
 Hex 1D 28 45 pL pH fn a d1 ... dk  
 Decimal 29 40 69 pL pH fn a d1 ... dk

**[Range]**  $3 \leq (pL + pH \times 256) \leq 65535$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )  
 fn = 11  
 a = 1  
 $48 \leq d \leq 57$

**[Default]** d1...dk = "38400" (upon shipment)**[Description]**

- Sets the configuration item for the serial interface specified by a to the values specified by d.

a	Configuration item
1	Transmission speed

- Transmission speed settings (a = 1)

d1...dk	Transmission speed
2400	2400 bps
4800	4800 bps
9600	9600 bps
19200	19200 bps
38400	38400 bps
57600	57600 bps
115200	115200 bps

**[Note]**

- The configuration item set by this function is enabled by executing GS ( E <Function 2> or restarting the printer. Note that the host computer must be set to enable the

printer to communicate with the host computer.

### <Function 12> GS ( E pL pH fn a (fn = 12)

**[Function]** Transmit the configuration item for the serial interface

**[Format]** ASCII GS ( E pL pH fn a  
 Hex 1D 28 45 pL pH fn a  
 Decimal 29 40 69 pL pH fn a

**[Range]**  $(pL + pH \times 256) = 2$  (pL = 2, pH = 0)

fn = 12

a = 1

**[Description]** Transmits the configuration item for the serial interface specified by a.

a	Configuration item
1	Transmission speed

## 5 Character Control Commands

### ESC ! n

<b>[Function]</b>	Select print mode(s)		
<b>[Format]</b>	ASCII	ESC !	n
	Hex	1B 21	n
	Decimal	27 33	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	Select the character font and styles (emphasized, double-height, double-width, and underlined) together.		

(n)Bit	Off/On	HEX	Decimal	Function
0	Off	00	0	Character font A (12 × 24) selected.
	On	01	1	Character font B (9 × 17) selected.
1,2	Off	00	0	Reserved.
3	Off	00	0	Emphasized mode is turned off.
	On	08	8	Emphasized mode is turned on.
4	Off	00	0	Double-height canceled.
	On	10	16	Double-height selected.
5	Off	00	0	Double-width canceled.
	On	20	32	Double-width selected.
6	Off	00	0	Reserved.
7	Off	00	0	Underline mode is turned off.
	On	80	128	Underline mode is turned on.

### ESC % n

<b>[Function]</b>	Select/cancel user-defined character set		
<b>[Format]</b>	ASCII	ESC %	n
	Hex	1B 25	n
	Decimal	27 37	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	<ul style="list-style-type: none"> <li>• Select or cancel the user-defined character set.</li> <li>• When the LSB of n is 0, the user-defined character set is canceled.</li> <li>• When the LSB of n is 1, the user-defined character set is selected.</li> </ul>		

**ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]****[Function]** Define user-defined characters

**[Format]** ASCII                ESC &    y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]  
 Hex                    1B 26    y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]  
 Decimal                27 38    y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

**[Range]** y = 3  
 $32 \leq c1 \leq c2 \leq 126$   
 $0 \leq x \leq 12$  [when Font A (12 × 24) is selected]  
 $0 \leq x \leq 9$  [when Font B (9 × 17) is selected]  
 $0 \leq d \leq 255$   
 $k = c2 - c1 + 1$

**[Description]**

- Define the user-defined character pattern for the specified character code
- y specifies the number of bytes in the vertical direction.
- c1 specifies the beginning character code for the definition, and c2 specifies the final code.
- x specifies the number of dots in the horizontal direction from the left edge.

**ESC ? n****[Function]** Cancel user-defined characters

**[Format]** ASCII                ESC ?    n  
 Hex                    1B 3F    n  
 Decimal                27 63    n

**[Range]**  $32 \leq n \leq 126$ **[Description]** • Deletes the user-defined character pattern specified by character code n.**ESC SP n****[Function]** Set right-side character spacing

**[Format]** ASCII                ESC SP    n  
 Hex                    1B 20    n  
 Decimal                27 32    n

**[Range]**  $0 \leq n \leq 255$ **[Default]** n = 0**[Description]** Set the right-side character spacing to [n × (horizontal or vertical motion unit)].**[Note]** The maximum right-side spacing is 35.98 mm {255/180"}.**CAN****[Function]** Cancel print data in page mode

**[Format]** ASCII                CAN  
 Hex                    18  
 Decimal                24

**[Description]** In page mode, deletes all the print data in the current print area.

- d specifies the defined data (column format).

**[Note]**

- User-defined characters and a downloaded bit image (GS \*) cannot be defined simultaneously. When this command is executed, the downloaded bit image is deleted.



**ESC – n****[Function]** Turn underline mode on/off

<b>[Format]</b>	ASCII	ESC	-	n
	Hex	1B	2D	n
	Decimal	27	45	n

**[Range]**  $0 \leq n \leq 2$ ,  $48 \leq n \leq 50$ **[Default]** n = 0**[Description]** Turns underline mode on or off.

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode, set at 1-dot width.
2, 50	Turns on underline mode, set at 2-dot width

**ESC E n****[Function]** Turn emphasized mode on/off

<b>[Format]</b>	ASCII	ESC	E	n
	Hex	1B	45	n
	Decimal	27	69	n

**[Range]**  $0 \leq n \leq 255$ **[Default]** n = 0

**[Description]**

- Turns emphasized mode on or off.
- When the LSB of n is 0, turns off emphasized mode.
- When the LSB of n is 1, turns on emphasized mode.

**ESC R n****[Function]** Select an international character set

<b>[Format]</b>	ASCII	ESC	R	n
	Hex	1B	52	n
	Decimal	27	82	n

**[Range]**  $0 \leq n \leq 15$ **[Default]** n = 0 [Other than the following models]

n = 15 [Simplified Chinese model]

**[Description]** Selects an international character set

n	International character set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark I
5	Sweden

6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin America
13	Korea
14	Slovenia / Croatia
15	China

**ESC M n****[Function]** Select character font**[Format]** ASCII ESC M n

Hex 1B 4D n

Decimal 27 77 n

**[Range]** n = 0, 1, 48, 49**[Default]** n = 0**[Description]** • Selects a character font.

n	Character font
0,48	Character font A (12 × 24)
1,49	Character font B (9 × 17)

**[Reference]** "3.2.13 International Character Sets"**ESC V n****[Function]** Turn 90° clockwise rotation mode on/off**[Format]** ASCII ESC V n

Hex 1B 56 n

Decimal 27 86 n

**[Range]**  $0 \leq n \leq 2$ ,  $48 \leq n \leq 50$ **[Default]** n = 0**[Description]** • In standard mode, turns 90° clockwise rotation mode on or off for characters.

n	Function
0, 48	Turns off 90° clockwise rotation mode.
1, 49 2, 50	Turns on 90° clockwise rotation mode.

**ESC { n**

<b>[Function]</b>	Selecting upside-down printing mode		
<b>[Format]</b>	ASCII	ESC {	n
	Hex	1B 7B	n
	Decimal	27 123	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	<ul style="list-style-type: none"> <li>• In standard mode, turns upside-down print mode on or off.</li> <li>• When the LSB of n is 0, turns off upside-down print mode.</li> <li>• When the LSB of n is 1, turns on upside-down print mode.</li> </ul>		

**ESC G n**

<b>[Function]</b>	Turn double-strike mode on/off		
<b>[Format]</b>	ASCII	ESC G	n
	Hex	1B 47	n
	Decimal	27 71	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	<ul style="list-style-type: none"> <li>• Turns double-strike mode on or off.</li> <li>• When the LSB of n is 0, turns off double-strike mode.</li> <li>• When the LSB of n is 1, turns on double-strike mode.</li> </ul>		

**GS B n**

<b>[Function]</b>	Turn white/black reverse print mode on/off		
<b>[Format]</b>	ASCII	GS B	n
	Hex	1D 42	n
	Decimal	29 66	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	<ul style="list-style-type: none"> <li>• Turns white/black reverse print mode on or off.</li> <li>• When the LSB of n is 0, turns off white/black reverse mode.</li> <li>• When the LSB of, n is 1, turns on white/black reverse mode.</li> </ul>		

**GS ! n**

<b>[Function]</b>	Select character size		
<b>[Format]</b>	ASCII	GS !	n
	Hex	1D 21	n
	Decimal	29 33	n
<b>[Range]</b>	$0 \leq n \leq 7, 16 \leq n \leq 23, 32 \leq n \leq 39, 48 \leq n \leq 55, 64 \leq n \leq 71,$ $80 \leq n \leq 87, 96 \leq n \leq 103, 112 \leq n \leq 119$ (1≤Enlargement in vertical direction≤8, 1≤Enlargement in horizontal direction≤8)		
<b>[Default]</b>	n = 0		
<b>[Description]</b>	Selects character size (height magnification and width magnification).		

(n) Bit	Off/On	Hex	Decimal	Function
0 - 2	See table [Height magnification]			Selects the height magnification.
3	Off	00	0	Reserved.
4 - 6	See table [Width magnification]			Selects the width magnification.
7	Off	00	0	Reserved.

[Height magnification]

Hex	Decimal	Enlargement
00	0	1 time (standard)
01	1	2 times
02	2	3 times
03	3	4 times
04	4	5 times
05	5	6 times
06	6	7 times
07	7	8 times

[Width magnification]

Hex	Decimal	Enlargement
00	0	1 time (standard)
10	16	2 times
20	32	3 times
30	48	4 times
40	64	5 times
50	80	6 times
60	96	7 times
70	112	8 times

**ESC t n****[Function]** Select character code table

**[Format]** ASCII                ESC t    n  
Hex                1B   74   n  
Decimal            27   116   n

**[Range]**  $0 \leq n \leq 5$ ,  $16 \leq n \leq 19$ ,  $n = 255$ **[Default]**  $n = 0$ **[Description]** Selects page n from the character code table.

n	Character code table
0	PC437: USA, Standard Europe
2	PC850: Multilingual
3	PC860: Portuguese
4	PC863: Canadian-French
5	PC865: Nordic
17	PC866: Cyrillic #2
18	PC852: Latin2
19	PC858: Euro
20	KU42: Thai
21	TIS11: Thai
26	TIS18: Thai
32	PC720: Arabic
255	Page 255 [User-defined page]

## 6 Macro Function Commands

### GS :

**[Function]** Start/end macro definition

**[Format]** ASCII GS :  
Hex 1D 3A  
Decimal 29 58

**[Description]** Starts or ends macro definition.

**[Note]** The contents of the macro can be defined up to 2048 bytes.

### GS ^ r t m

**[Function]** Execute macro

**[Format]** ASCII GS ^ r t m  
Hex 1D 5E r t m  
Decimal 29 94 r t m

**[Range]**  $1 \leq r \leq 255$

$0 \leq t \leq 255$

$m = 0, 1$

**[Description]** Executes the macro that was defined with GS :.

m	Operation
0	Executes the macro r times continuously at an interval of $[t \times 100 \text{ ms}]$ .
1	After waiting for $[t \times 100 \text{ ms}]$ , flashes the LED indicator and waits for the FEED button to be pressed. After the button is pressed, executes the macro once. Then repeats the operation r times.

## 7 Status Commands

### GS a n

**[Function]** Enable/disable Automatic Status Back (ASB)

**[Format]** ASCII GS a n  
Hex 1D 61 n  
Decimal 29 97 n

**[Range]**  $0 \leq n \leq 255$

**[Default]** n = 0 [when DIP switch [SW 2-1] is off.]  
n = 2 [when DIP switch [SW 2-1] is on.]

**[Description]** • Enables or disables basic ASB (Automatic Status Back).

(n)Bit	Off / On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector status disabled.
	On	01	1	Drawer kick-out connector status enabled.
1	Off	00	0	Online/offline status disabled.
	On	02	2	Online/offline status enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Roll paper sensor status disabled.
	On	08	8	Roll paper sensor status enabled.
4-7	Off	00	0	Reserved.

• While basic ASB is active, the selected enabled basic ASB status is transmitted whenever the status changes.

• The basic ASB status to be transmitted is the four bytes that follow:

• First byte (printer information)

Bit	Off / On	Hex	Decimal	Status
0,1	Off	00	0	Fixed
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick out connector pin 3 is HIGH.
3	Off	00	0	Online
	On	08	8	Offline
4	On	10	16	Fixed
5	Off	00	00	Cover is closed.
	On	20	32	Cover is open.
6	Off	00	0	Paper is not being fed with the paper FEED button.
	On	40	64	Paper is being fed with the paper FEED button
7	Off	00	0	Fixed

• Second byte (printer information)

Bit	Off / On	Hex	Decimal	Status
0-2	_____	_____	_____	Reserved.
3	Off	00	0	No auto cutter error.
	On	08	8	Auto cutter error occurred.
4	Off	00	0	Fixed
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred.
6	Off	00	00	No automatically recoverable error
	On	40	64	Automatically recoverable error occurred.
7	Off	00	00	Fixed

• Third byte (paper sensor information)

Bit	Off / On	Hex	Decimal	Status
0,1	Off	00	0	Roll paper near-end sensor: paper adequate.
	On	03	3	Roll paper near-end sensor: paper near end.
2,3	Off	00	0	Roll paper end sensor (Paper sensor): paper present.
	On	0C	12	Roll paper end sensor (Paper sensor): paper not present.
4	Off	00	00	Fixed
5,6	_____	_____	_____	Reserved.
7	Off	00	00	Fixed

Bits 2 and 3: While the cover is open, this shows the state when the cover was still closed.

• Fourth byte (paper sensor information)

• Fourth byte (paper sensor information)

Bit	Off / On	Hex	Decimal	Status
0-3	_____	_____	_____	Reserved.
4	Off	00	00	Fixed
5,6	_____	_____	_____	Reserved.
7	Off	00	00	Fixed

**DLE EOT n****[Function]** Transmit real-time status

**[Format]** ASCII                      DLE EOT n  
 Hex                                10 04 n  
 Decimal                          16 4 n

**[Range]**  $1 \leq n \leq 4$ **[Description]** Transmit the real-time status.

n	Function
1	Transmits printer status.
2	Transmits offline cause status.
3	Transmits error cause status.
4	Transmits roll paper sensor status.

- This printer transmits the following status in real time.

- Printer status (n = 1)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	Online
	On	08	8	Offline.
4	On	10	16	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Online

- Offline cause status (n = 2)

Bit	Off/On	HEX	Decimal	Status
0	Off	00	0	Fix as 0
1	On	02	2	Fix as 1
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	Paper is not being fed with the paper FEED button.
	On	08	8	Paper is being fed with the paper FEED button.
4	On	10	16	Fixed.
5	Off	00	0	No paper end stop.
	On	20	32	Printing stopped due to paper end.
6	Off	00	0	No error.
	On	40	64	Error occurred.



7	Off	00	0	Fixed.
---	-----	----	---	--------

• Error cause status (n = 3)

Bit	Off/On	HEX	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2	--	--	--	Reserved.
3	Off	00	0	No auto cutter error.
	On	08	8	Auto cutter error occurred.
4	On	10	16	Fixed.
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurred
7	Off	00	0	Fixed.

• Roll paper sensor status (n = 4)

Bit	Off/On	HEX	Decimal	Status
0	Off	00	0	Fixed
1	On	02	2	Fixed
2,3	Off	00	0	Roll paper near-end sensor: paper adequate.
	On	0C	12	Roll paper near-end sensor: paper near end.
4	On	10	16	Fixed
5,6	Off	00	0	Roll paper end sensor (paper sensor): paper present.
	On	60	96	Roll paper end sensor (paper sensor): paper not present.
7	Off	00	0	Fixed

Bits 5 and 6: While the cover is open, this shows the state when the cover was still closed.

**[Note]**

- Take the following into consideration:
- If the received data includes a data string matching this command, the printer performs this command. Users must consider this.  
Example: Graphic data might accidentally include a data string matching this command.
- Do not embed this command within another command.  
Example: Graphic data might include this command.
- Transmit this command using the following method:
- When this command is transmitted, the subsequent data must not be transmitted until the status is received.
- However, if this command must be transmitted continuously, it is possible to transmit

up to 4 commands at once.

In this case, the subsequent data must not be transmitted until the all status is received.

If this command is transmitted without using the above method, the status may not be received.

## 8 Barcode Commands

### GS h n

<b>[Function]</b>	Set bar code height			
<b>[Format]</b>	ASCII	GS	h	n
	Hex	1D	68	n
	Decimal	29	104	n
<b>[Range]</b>	$1 \leq n \leq 255$			
<b>[Default]</b>	n = 162			
<b>[Description]</b>	• Sets the height of the bar code to n dots.			

### GS f n

<b>[Function]</b>	Select font for HRI characters			
<b>[Format]</b>	ASCII	GS	f	n
	Hex	1D	66	n
	Decimal	29	102	n
<b>[Range]</b>	n = 0, 1, 48, 49			
<b>[Default]</b>	n = 0			
<b>[Description]</b>	Select a font for the HRI characters when printing a bar code.			

n	Font for the HRI characters
0,48	Character font A (12 × 24)
1,49	Character font B (9 × 17)

### GS H n

<b>[Function]</b>	Select print position of HRI characters			
<b>[Format]</b>	ASCII	GS	H	n
	Hex	1D	48	n
	Decimal	29	72	n
<b>[Range]</b>	$0 \leq n \leq 3, 48 \leq n \leq 51$			
<b>[Range]</b>	n = 0			
<b>[Description]</b>	Select the print position of HRI characters when printing a bar code.			

n	Print position
0, 48	Not printed.
1, 49	Above the bar code.
2, 50	Below the bar code.
3, 51	Both above and below the bar code.

### GS k

<b>[Function]</b>	Print barcode				
<b>[Format]</b>	<A> ASCII	GS	k	m	d1...dk NUL
	Hex	1D	6B	m	d1...dk 00
	Decimal	29	107	m	d1...dk 0
	<B> ASCII	GS	k	m	n d1...dn
	Hex	1D	6B	m	n d1...dn
	Decimal	29	107	m	n d1...dn
<b>[Range]</b>	<A> $0 \leq m \leq 6$ (For the range of k and d, see [Description].)				
	<B> $65 \leq m \leq 73$ (For the range of n and d, see [Description].)				
<b>[Description]</b>	Print the bar code using the bar code system specified by m.				

For <Function A>

m	Bar code system	Range of k	Range of d
0	UPC-A	$k = 11, 12$	$48 \leq d \leq 57$
1	UPC-E	$k = 11, 12$	$48 \leq d \leq 57$ [where $d1 = 48$ ]
2	JAN13 / EAN13	$k = 12, 13$	$48 \leq d \leq 57$
3	JAN8 / EAN8	$k = 7, 8$	$48 \leq d \leq 57$
4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 42, 43, 45, 46, 47$
5	ITF	$2 \leq k$ (even umber)	$48 \leq d \leq 57$
6	CODABAR (NW-7)	$2 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $97 \leq d \leq 100,$ $d = 36, 43, 45, 46, 47, 58$ [where $65 \leq d1 \leq 68, 65 \leq dk \leq 68,$ $97 \leq d1 \leq 100, 97 \leq dk \leq 100$ ]

- k of <Function A> indicates the number of bytes of bar code data.
- d specifies the bar code data.

For <Function B>

m	Bar code system	Range of n	Range of d
65	UPC-A	n = 11, 12	$48 \leq d \leq 57$
66	UPC-E	n = 11, 12	$48 \leq d \leq 57$ [where d1 = 48]
67	JAN13 / EAN13	n = 12, 13	$48 \leq d \leq 57$
68	JAN8 / EAN8	n = 7, 8	$48 \leq d \leq 57$
69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57$ , $65 \leq d \leq 90$ , d = 32, 36, 37, 42, 43, 45, 46, 47
70	ITF	$2 \leq n \leq 254$ (even number)	$48 \leq d \leq 57$
71	CODABAR NW-7)	$2 \leq n \leq 255$	$48 \leq d \leq 57$ , $65 \leq d \leq 68$ , $97 \leq d \leq 100$ , d = 36, 43, 45, 46, 47, 58 [where $65 \leq d1 \leq 68$ , $65 \leq dn \leq 68$ , $97 \leq d1 \leq 100$ , $97 \leq dn \leq 100$ ]
72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$ [where d1 = 123, $65 \leq d2 \leq 67$ ]

**[Note]**

- n of <Function B> specifies the number of bytes of bar code data.
- d specifies the bar code data.
- Users must secure the quiet zone (left or right side space area defined by the bar code standard) for bar code printing.

**GS w n****[Function]** Set bar code width

**[Format]** ASCII                GS                w                n  
Hex                        1D                77                n  
Decimal                    29                119                n

**[Range]**  $2 \leq n \leq 6$ **[Range]** n = 3**[Description]** • Sets the horizontal size of the bar code.

n	Multi-level bar code	Binary-level bar code	
	Module width (mm)	Thin element width (mm)	Thick element width (mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

- Multi-level bar codes are as follows: UPC-A, UPC-E, JAN13 / EAN13, JAN8 / EAN8, CODE93, and CODE128
- Binary-level bar codes are as follows: CODE39, ITF, and CODABAR

**GS ( k pL pH cn fn [parameters])****[Function]** Set up and print symbol

- [Description]**
- Processes the data for symbols.
  - pL, pH specify (pL + pH × 256) as the number of bytes after pH (cn, fn, and [parameters]).
  - cn specifies the type of symbol.
  - fn specifies the function.
  - [parameters] specify the process of each function.

cn	Type of Symbol
48	PDF417 (two-dimensional codes)
49	QR Code (two-dimensional codes)

cn	fn	Format	Function No.	Function name
48	65	GS ( k pL pH cn fn n	065	PDF417: Set the number of columns in the data region.
	66	GS ( k pL pH cn fn n	066	PDF417: Set the number of rows
	67	GS ( k pL pH cn fn n	067	PDF417: Set the width of the module.
	68	GS ( k pL pH cn fn n	068	PDF417: Set the row height.
	69	GS ( k pL pH cn fn m n	069	PDF417: Set the error correction level.
	70	GS ( k pL pH cn fn m	070	PDF417: Select the options.
	80	GS ( k pL pH cn fn m d1...dk	080	PDF417: Store the data in the symbol storage area.
	81	GS ( k pL pH cn fn m	081	PDF417: Print the symbol data in the symbol storage area.
	82	GS ( k pL pH cn fn m	082	PDF417: Transmit the size information of the symbol data in the symbol storage area.
49	65	GS ( k pL pH cn fn n1 n2	165	QR Code: Select the model.
	67	GS ( k pL pH cn fn n	167	QR Code: Set the size of module.
	69	GS ( k pL pH cn fn n	169	QR Code: Select the error correction level.
	80	GS ( k pL pH cn fn m d1...dk	180	QR Code: Store the data into the symbol storage area.
	81	GS ( k pL pH cn fn m	181	QR Code: Print the symbol data in the symbol storage area.
	82	GS ( k pL pH cn fn m	182	QR Code: Transmit the size information of the symbol data in the symbol storage area.

- [Note]**
- "Symbol data" means the data received with <Function 080 or 180> before encoding.
  - "Symbol storage area" means the area where the data received with <Function 080 or 180> before encoding is stored.
  - When <Function 082 or 182> is transmitted, do not transmit the subsequent data until the status is received.
  - PDF417 (cn=48) is supported in ANK model.

**<Function 067> GS ( k pL pH cn fn n (cn = 48, fn = 67)**

<b>[Function]</b>	PDF417: Set the width of the module									
<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	n	
	Hex	1D	28	6B	pL	pH	cn	fn	n	
	Decimal	29	40	107	pL	pH	cn	fn	n	
<b>[Range]</b>	$(pL + pH \times 256) = 3$ ( $pL = 3, pH = 0$ )									
	cn = 48									
	fn = 67									
	$2 \leq n \leq 8$									
<b>[Default]</b>	n = 3									
<b>[Description]</b>	Sets the width of the module for PDF417 to n dots									

**<Function 068> GS ( k pL pH cn fn n (cn = 48, fn = 68)**

<b>[Function]</b>	PDF417: Set the row height									
<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	n	
	Hex	1D	28	6B	pL	pH	cn	fn	n	
	Decimal	29	40	107	pL	pH	cn	fn	n	
<b>[Range]</b>	$(pL + pH \times 256) = 3$ ( $pL = 3, pH = 0$ )									
	cn = 48									
	fn = 68									
	$2 \leq n \leq 8$									
<b>[Default]</b>	n = 3									
<b>[Description]</b>	Set the row height for PDF417 to $[n \times (\text{the width of the module})]$									

**<Function 080> GS ( k pL pH cn fn m d1...dk (cn = 48, fn = 80)**

<b>[Function]</b>	PDF417: Store the data in the symbol storage area									
<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
	Hex	1D	28	6B	pL	pH	cn	fn	m	d1...dk
	Decimal	29	40	107	pL	pH	cn	fn	m	d1...dk
<b>[Range]</b>	$4 \leq (pL + pH \times 256) \leq 65535$ ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )									
	cn = 48									
	fn = 80									
	m = 48									
	$0 \leq d \leq 255$									
	$k = (pL + pH \times 256) - 3$									
<b>[Description]</b>	Stores the PDF417 symbol data (d1...dk) in the symbol storage area									

**<Function 081> GS ( k pL pH cn fn m (cn = 48, fn = 81)**

<b>[Function]</b>	PDF417: Print the symbol data in the symbol storage area									
<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	m	
	Hex	1D	28	6B	pL	pH	cn	fn	m	
	Decimal	29	40	107	pL	pH	cn	fn	m	
<b>[Range]</b>	$(pL + pH \times 256) = 3$ ( $pL = 3, pH = 0$ )									
	cn = 48									

fn = 81

m = 48

**[Description]** Encodes and prints the PDF417 symbol data in the symbol storage area with GS ( k <Function 080>.

**[Note]**

- User must secure the quiet zone (left, right, upward, and downward space areas defined by the PDF417 symbol specifications) for PDF417 printing.
- In standard mode, symbols higher than 831 dots cannot be printed with this printer.

#### <Function 082> GS ( k pL pH cn fn m (cn = 48, fn = 82)

**[Function]** PDF417: Transmit the size information of the symbol data in the symbol storage area

<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	m
	Hex	1D	28	6B	pL	pH	cn	fn	m
	Decimal	29	40	107	pL	pH	cn	fn	m

**[Range]** (pL + pH × 256) = 3 (pL = 3, pH = 0)  
 cn = 48  
 fn = 82  
 m = 48

**[Description]** Transmit the size information for the encoded PDF417 symbol data in the symbol storage area with GS ( k <Function 080>.

**[Note]**

- This function does not print.
- The size information does not include the quiet zone (left, right, upward, and downward space areas defined by the PDF417 symbol specifications).

#### <Function 167> GS ( k pL pH cn fn n (cn = 49, fn = 67)

**[Function]** QR Code: Set the size of module

<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	n
	Hex	1D	28	6B	pL	pH	cn	fn	n
	Decimal	29	40	107	pL	pH	cn	fn	n

**[Range]** (pL + pH × 256) = 3 (pL = 3, pH = 0)  
 cn = 49  
 fn = 67  
 1 ≤ n ≤ 16

**[Default]** n = 3

**[Description]** Set the size of the module for QR Code to n dots

#### <Function 169> GS ( k pL pH cn fn n (cn = 49, fn = 69)

**[Function]** QR Code: Select the error correction level

<b>[Format]</b>	ASCII	GS	(	k	pL	pH	cn	fn	n
	Hex	1D	28	6B	pL	pH	cn	fn	n
	Decimal	29	40	107	pL	pH	cn	fn	n

**[Range]** (pL + pH × 256) = 3 (pL = 3, pH = 0)  
 cn = 49  
 fn = 69



$48 \leq n \leq 51$ 
**[Default]**

n = 48

**[Description]**

- Selects the error correction level for QR Code.

n	Function	Reference: Approx. figure of recovery
48	Select error correction level L	7 %
49	Select error correction level M 1	15 %
50	Select error correction level Q 2	25 %
51	Select error correction level H 3	30 %

**<Function 180> GS ( k pL pH cn fn m d1...dk (cn = 49, fn = 80)****[Function]** QR Code: Store the data in the symbol storage area

**[Format]**

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	cn	fn	m	d1...dk
Decimal	29	40	107	pL	pH	cn	fn	m	d1...dk

**[Range]**  $4 \leq (pL + pH \times 256) \leq 7092$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 27$ )

cn = 49

fn = 80

m = 48

 $0 \leq d \leq 255$  $k = (pL + pH \times 256) - 3$ **[Description]** Store the QR Code symbol data (d1...dk) into the symbol storage area**<Function 181> GS ( k pL pH cn fn m (cn = 49, fn = 81)****[Function]** QR Code: Print the symbol data in the symbol storage area

**[Format]**

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	pL	pH	cn	fn	m
Decimal	29	40	107	pL	pH	cn	fn	m

**[Range]**  $(pL + pH \times 256) = 3$  ( $pL = 3, pH = 0$ )

cn = 49

fn = 81

m = 48

**[Description]** Encodes and prints the QR Code symbol data in the symbol storage area with GS ( k <Function 180>.**[Note]** User must secure the quiet zone (left, right, upward, and downward space areas defined by the QR Code symbol specifications) for QR Code printing.

## 9 Mechanical Control Commands

### GS V

**[Function]** Select cut mode and cut paper

**[Format]**

<A> ASCII	GS	V	m
Hex	1D	56	m
Decimal	29	86	m
<B> ASCII	GS	V	m n
Hex	1D	56	m n
Decimal	29	86	m n

**[Range]** <A> m = 0, 1, 48, 49

<B> m = 65, 66, 0 <n ≤ 255

**[Description]** Executes paper cutting specified by m.

m		Function
<A>	0, 48	Cuts paper.
	1, 49	
<B>	65, 66	Feeds paper to (cutting position + [n × (vertical motion unit)]) and cuts the paper.

**[Note]** This printer executes a partial cut (one point left uncut).

### ESC i

**[obsolete command]**

**[Function]** Partial cut (one point left uncut)

**[Format]**

ASCII	ESC	i
Hex	1B	69
Decimal	27	105

**[Description]** Executes a partial cut of the roll paper.

- [Note]**
- See **GS V <Function A>** for details.
  - The cutting shape depends on the specification of the mounted auto-cutter.

### ESC m

**[obsolete command]**

**[Function]** Partial cut (three points left uncut)

**[Format]**

ASCII	ESC	i
Hex	1B	6D
Decimal	27	109

**[Description]** Executes a partial cut of the roll paper.

- [Note]**
- See **GS V <Function A>** for details.
  - The cutting shape depends on the specification of the mounted auto-cutter.

## 10 Other Commands

### FS p n m

[obsolete command]

GS ( L <Function 69>, which is the upward-compatible command replacing FS p, is recommended to use, since FS p is an obsolete command in the ESC/POS command system.

**[Function]** Print NV bit image

**[Format]**

ASCII	FS	p	n	m
Hex	1C	70	n	m
Decimal	28	112	n	m

**[Range]**  $1 \leq n \leq 255$

$0 \leq m \leq 3, 48 \leq m \leq 51$

**[Description]** Prints NV bit image n using the process of FS q and using the mode specified by m.

m	Mode	Vertical direction	Horizontal direction
0,48	Normal 1	180 dpi	180 dpi
1,49	Double-width 1	180 dpi	90 dpi
2,50	Double-height 9	90 dpi	180 dpi
3,51	Quadruple 9	90 dpi	90 dpi

### FS q n [xL xH yL yH d1...dk]1 ... [xL xH yL yH d1...dk]n

[obsolete command]

GS ( L <Function 67>, which is the upward-compatible command replacing FS q, is recommended to use, since FS q is an obsolete command in the ESC/POS command system.

**[Function]** Define NV bit image

**[Format]**

ASCII	FS	q	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
Hex	1C	71	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
Decimal	28	113	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

**[Range]**  $1 \leq n \leq 255$

$1 \leq (xL + xH \times 256) \leq 1023$  ( $0 \leq xL \leq 255, 0 \leq xH \leq 3$ )

$1 \leq (yL + yH \times 256) \leq 288$  ( $0 \leq yL \leq 255, yH = 0,1$ )

$0 \leq d \leq 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

The entire capacity size = 256 KB.

**[Description]**

- Defines the NV bit image in the NV graphics area.
- n specifies the number of defined NV bit images.
- xL, xH specify the number of bytes in the horizontal direction as  $(xL + xH \times 256)$ .
- yL, yH specify the number of bytes in the vertical direction as  $(yL + yH \times 256)$ .
- d specifies the defined data (column format).

**[Note]**

- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing the commands into the NV memory to less than 10 times a day.
- If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Do not turn the power

off or do not reset the printer via an interface while this command is being executed.

- While processing this command, the printer may become BUSY while writing data to the NV memory and stops receiving data. Therefore, do not to transmit data from the host computer while the printer is BUSY.
- The printer executes a software reset after processing this command.
- Clear the receiver and print buffers.
- Resets all setting values in RAM (the print area, the character styles, user-defined characters, and others) that were in effect at power on. (The data in the NV memory are not reset.)
- NV bit image and NV graphics (GS (L/ GS 8 L) cannot be defined simultaneously. When this command is executed, all NV graphics are deleted.

### GS v 0 m xL xH yL yH d1...dk

[obsolete command]

GS (L <Function 112 and 50>, which is the upward-compatible command replacing GS v 0, is recommended to use, since GS v 0 is an obsolete command in the ESC/POS command system.

**[Function]** Print raster bit image

**[Format]**

ASCII	GS	v	0	m	xL	xH	yL	yH	d1...dk
Hex	1D	76	30	m	xL	xH	yL	yH	d1...dk
Decimal	29	118	48	m	xL	xH	yL	yH	d1...dk

**[Range]**

$0 \leq m \leq 3, 48 \leq m \leq 51$

$1 \leq (xL + xH \times 256) \leq 65535 \quad (0 \leq xL \leq 255, 0 \leq xH \leq 255)$

$1 \leq (yL + yH \times 256) \leq 2303 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 8)$

$0 \leq d \leq 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256)$

**[Description]** • Prints a raster bit image using the mode specified by m.

m	Mode	Vertical direction	Horizontal direction
0,48	Normal	180 dpi	180 dpi
1,49	Double-width	180 dpi	90 dpi
2,50	Double-height	90 dpi	180 dpi
3,51	Quadruple	90 dpi	90 dpi

- xL, xH specify the number of bytes in the horizontal direction as  $(xL + xH \times 256)$ .
- yL, yH specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
- d specifies the defined data (raster format)

### FS g 1 m a1 a2 a3 a4 nL nH d1...dk

**[Function]** Write to NV user memory

**[Format]**

ASCII	FS	g	1	m	a1	a2	a3	a4	nL	nH	d1...dk
Hex	1C	67	31	m	a1	a2	a3	a4	nL	nH	d1...dk
Decimal	28	103	49	m	a1	a2	a3	a4	nL	nH	d1...dk

**[Range]**

$m = 0$

$0 \leq (a1 + a2 \times 256 + a3 \times 65536 + a4 \times 16777216) \leq 1023$

$(0 \leq a1 \leq 255, 0 \leq a2 \leq 3, a3 = 0, a4 = 0)$

$1 \leq (nL + nH \times 256) \leq 1024 \quad (0 \leq nL \leq 255, 0 \leq nH \leq 4)$

$$32 \leq d \leq 255$$

$$k = (nL + nH \times 256)$$

The entire capacity size = 1KB.

**[Description]** Stores the data (d1...dk) in the area from (a1 + a2 × 256 + a3 × 65536 + a4 × 16777216) to (nL + nH × 256) bytes in the NV user memory.

**[Note]**

- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing the commands into the NV memory to less than 10 times a day.
- If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
- While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data, including the real-time commands while the printer is BUSY.

FS g 2 m a1 a2 a3 a4 nL nH											[obsolete command]
<b>[Function]</b>	Read from NV user memory										
<b>[Format]</b>	ASCII	FS	g	2	m	a1	a2	a3	a4	nL	nH
	Hex	1C	67	32	m	a1	a2	a3	a4	nL	nH
	Decimal	28	103	50	m	a1	a2	a3	a4	nL	nH
<b>[Range]</b>	m = 0 $0 \leq (a1 + a2 \times 256 + a3 \times 65536 + a4 \times 16777216) \leq 1023$ $(0 \leq a1 \leq 255, 0 \leq a2 \leq 3, a3 = 0, a4 = 0)$ $1 \leq (nL + nH \times 256) \leq 80 \quad (1 \leq nL \leq 80, nH = 0)$										
<b>[Description]</b>	Transmits the data in the area from (a1 + a2 × 256 + a3 × 65536 + a4 × 16777216) to (nL + nH × 256) bytes in the NV user memory.										
<b>[Note]</b>	When this command is transmitted, do not transmit the subsequent data until the status is received.										

GS g 0 m nL nH							
[Function]	Initialize maintenance counter						
[Format]	ASCII	GS	g	0	m	nL	nH
	Hex	1D	67	30	m	nL	nH
	Decimal	29	103	48	m	nL	nH
[Range]	m = 0						
	(nL + nH × 256) = 20, 21, 50, 70						
[Description]	Set the resettable maintenance counter specified by (nL + nH × 256) to 0.						

(nL + nH × 256)		Maintenance counter [Units]
Hex	Decimal	
14	20	Number of lines fed. [Lines]
15	21	Number of head energization. [Times]
32	50	Number of auto cutter operations. [Times].
46	70	Duration of printer operation. [Hours].

**[Note]**

- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing the commands into the NV memory to less than 10 times a day.
- If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Do not turn the power off or do not reset the printer via an interface while this command is being executed.
- While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, do not transmit data from the host computer while the printer is BUSY.

**ESC 2**

<b>[Type]</b>	Line spacing		
<b>[Function]</b>	Select default line spacing		
<b>[Format]</b>	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50
<b>[Description]</b>	Sets the line spacing to approximately 4.23 mm (1/6 inches)		

**ESC 3 n**

<b>[Type]</b>	Line spacing		
<b>[Function]</b>	Set line spacing		
<b>[Format]</b>	ASCII	ESC 3	n
	Hex	1B 33	n
	Decimal	27 51	n
<b>[Range]</b>	$0 \leq n \leq 255$		
<b>[Default]</b>	Equivalent to approximately 4.23 mm {1/6"}		
<b>[Description]</b>	Sets the line spacing to [n × (vertical or horizontal motion unit)]		
<b>[Note]</b>	The maximum is 1016 mm {40"}.		

**ESC c 3 n****[Type]** Paper sensor**[Function]** Select paper sensor(s) to output paper-end signals

**[Format]** ASCII                ESC c    3    n  
 Hex                    1B   63   33   n  
 Decimal                27   99   51   n

**[Range]**  $0 \leq n \leq 255$ 

**[Default]** n = 0    [when DIP switch [SW 1-3] is on.]  
 n = 15   [when DIP switch [SW 1-3] is off.]

**[Description]** Select whether the paper sensor(s) to output paper end signals or not when a paper end is detected.

(n)Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disables roll paper near-end sensor.
	On	01	1	Enables roll paper near-end sensor.
1	Off	00	0	Disables roll paper near-end sensor.
	On	02	2	Enables roll paper near-end sensor.
2	Off	00	00	Disables roll paper end sensor (paper sensor).
	On	04	4	Enables roll paper end sensor (paper sensor).
3	Off	00	00	Disables roll paper end sensor (paper sensor).
	On	08	8	Enables roll paper end sensor (paper sensor).
4-7	Off	00	0	Reserved.

**[Note]** This command is enabled only with a parallel interface model.

**ESC c 4 n****[Type]** Paper sensor**[Function]** Selecting paper sensor to stop printing

**[Format]** ASCII                ESC c    4    n  
 Hex                    1B   63   34   n  
 Decimal                27   99   52   n

**[Range]**  $0 \leq n \leq 255$ **[Default]** n = 0

**[Description]** Select the paper sensor(s) whether to use to stop printing or not when a paper end is detected.

(n)Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Roll paper near-end sensor disabled
	On	01	1	Roll paper near-end sensor enabled.
1	Off	00	0	Roll paper near-end sensor disabled
	On	02	2	Roll paper near-end sensor enabled.
2-7	Off	00	0	Reserved.

**ESC c 5 n****[Type]** Panel button**[Function]** Enable/disable panel buttons

**[Format]**

ASCII	ESC	c	5	n
Hex	1B	63	35	n
Decimal	27	99	53	n

**[Range]**  $0 \leq n \leq 255$ **[Default]**  $n = 0$ 

**[Description]**

- Enables or disables the panel buttons.
- When the LSB of n is 0, the panel buttons are enabled.
- When the LSB of n is 1, the panel buttons are disabled.

**[Note]**

- This command affects the FEED button.
- The FEED button is disabled regardless of the settings with this command, when the cover is open.

**GS g 2 m nL nH****[Function]** Transmit maintenance counter

**[Format]**

ASCII	GS	g	2	m	nL	nH
Hex	1D	67	32	m	nL	nH
Decimal	29	103	50	m	nL	nH

**[Range]**  $m = 0$  $(nL + nH \times 256) = 20, 21, 50, 70, 148, 149, 178, 198$  $(nL = 20, 21, 50, 70, 148, 149, 178, 198, \quad nH = 0)$ **[Description]** Transmits the value of the maintenance counter specified by  $(nL + nH \times 256)$ .

$(nL + nH \times 256)$		Maintenance counter [Units]	Type of counter
Hex	Decimal		
14	20	Number of lines fed. [Lines]	Resettable (can be reset)
15	21	Number of head energization. [Times]	
32	50	Number of auto cutter operations. [Times].	
46	70	Duration of printer operation. [Hours]	
94	148	Number of lines fed. [Lines]	Cumulative
95	149	Number of head energization. [Times]	
B2	178	Number of auto cutter operations. [Times].	
C6	198	Duration of printer operation. [Hours].	

**[Note]**

- The maintenance counter values are measurements; therefore, their values will be affected by the timing of errors and how and when the power is turned off.
- When this command is transmitted, do not transmit the subsequent data until the status is received.



## **DASCOM REPRESENTATIVES**

### **GERMANY**

DASCOM Europe GmbH  
Heuweg 3  
D-89079 Ulm  
Deutschland  
Tel.: +49 (0) 731 2075 0  
Fax: +49 (0) 731 2075 100  
[www.dascom.com](http://www.dascom.com)

### **SINGAPORE (ASIA PACIFIC)**

DASCOM AP Pte Ltd  
21 Bukit Batok Crescent  
#29-81, WCEGA Tower  
Singapore 658065  
Phone: +65 6760 8833  
Fax: +65 6760 1066  
[www.dascom.com](http://www.dascom.com)

### **AMERICAS**

DASCOM Americas Corporation  
421 W. Main Street,  
Waynesboro, VA 22980  
USA  
Phone: +1 (877) 434 13 77  
[www.dascom.com](http://www.dascom.com)

### **UNITED KINGDOM**

DASCOM GB Ltd  
Hart House, Priestley Road  
Basingstoke, Hampshire  
RG24 9PU, England  
Phone: +44 (0) 1256 481481  
Fax: +44 (0) 1256 481400  
[www.dascom.com](http://www.dascom.com)

### **FRANCE**

DASCOM Europe GmbH  
117 Avenue Victor Hugo  
92100 Boulogne-Billancourt  
France  
Phone: +33 (1) 73 02 51 98  
[www.dascom.com](http://www.dascom.com)

### **CHINA**

JIANGMEN DASCOM COMPUTER  
PERIPHERALS CO., LTD  
No. 399, Jinxing Road, Jianghai District,  
Jiangmen, Guangdong P.R. China  
[www.dascom.com.cn](http://www.dascom.com.cn)

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